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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/657,386	09/08/2000	Toshiaki Yoshihara	1100.64726	3309

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EXAMINER

AKKAPEDDI, PRASAD R

ART UNIT PAPER NUMBER

2871

DATE MAILED: 06/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/657,386

Applicant(s)

YOSHIHARA ET AL.

Examiner

Prasad R Akkapeddi

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities: On line 3, change 'therebetween' to 'there between'. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation "wherein the spontaneous polarization of the liquid crystal is a magnitude of not more than $\frac{1}{2}$ of a maximum quantity of charge that is injected to the liquid crystal display element corresponding to a pixel when the switching element is turned on" is not clear due to the term $\frac{1}{2}$ of charge. The $\frac{1}{2}$ is a relative term and as such should reflect relative to another element such as a conventional liquid crystal element. Spontaneous polarization can't have a magnitude of more than $\frac{1}{2}$ the charge. For the ferroelectric liquid crystal display device, $\frac{1}{2}$ the charge of a conventional device is required to exhibit switching and thus spontaneous polarization is exhibited by the element. The remaining claims are also rejected since they depend on the indefinite claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1 and 3 are rejected under 35 U.S.C. 102(e) as being anticipated by Okada et al (Okada) (U.S. Patent No. 6,177,968).

As to claim 1: Okada discloses a liquid crystal display device having a pair of substrates (1) and (11), see Fig. 1, with a liquid crystal (16) in between, with a spontaneous polarization (Col 2, line 15) and a switching element TFT (227) that drives the liquid crystal corresponding to a pixel when turned on. In (Col 16, lines 15-23) Okada discloses for electric charge required for switching (inversion) or (spontaneous polarization) is half of that for the conventional switching.

The limitation "wherein the spontaneous polarization of the liquid crystal is a magnitude of not more than ½ of a maximum quantity of charge that is injected

to the liquid crystal display element corresponding to a pixel when the switching element is turned on" is interpreted as follows: The $\frac{1}{2}$ is a relative term and as such should reflect relative to another element such as a conventional liquid crystal element. Spontaneous polarization is exhibited by the liquid crystal element when a charge is applied. Spontaneous polarization can't have a magnitude of more than $\frac{1}{2}$ the charge. For the ferroelectric liquid crystals, $\frac{1}{2}$ the charge is required to exhibit switching as compared to conventional liquid crystals.

As to claim 3: Okada discloses color filters (13) of the three primary colors, red (13a), green (13b) and blue (13c).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 5-7, 9-11, 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodon et al (Kodon) (U.S. Patent No. 5,465,168) in view of Okada.

a. Although Okada discloses a liquid crystal display device having spontaneous polarization at $\frac{1}{2}$ the charge of a conventional device, Okada does not disclose the relationship of dielectric constant to various liquid crystal materials having different spontaneous polarization values. However, in (Col 12, lines 28-63) Kodon discloses in great detail the relationship between dielectric

constant and spontaneous polarization and the requirement of keeping the dielectric constant at a low value. Kodon also discloses several compositions of liquid crystal material that are commercially available, with varying degrees of spontaneous polarization. Kodon also discloses that several other compositions of liquid crystals may be mixed together (Col 11, line 35-37). So, it is fairly obvious to mix liquid crystal materials having the spontaneous polarization values (15 nC/cm², 10nC/cm² and 7nC/cm²) as claimed in claims 5, 9 and 13 with a dielectric constant of not less than 3, as claimed in claims 6, 10 and 14. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt different compositions of liquid crystal materials disclosed by Kodon to the liquid crystal display disclosed by Okada, because these devices will enable large angle viewing by better matching the polarity of spontaneous polarization of the liquid crystals with that of an electric field.

7. Claims 4, 8, 12 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al (Ishii) (U.S. Patent No. 5,642,214) in view of Okada

Although Okada discloses color filters for the three primary colors for illuminating a liquid crystal display, Okada does not explicitly disclose the use of three separate light sources emitting light rays of three primary colors. It is also quite well known in the art that three primary colors for illumination can be obtained either from a single white light source having filters at the primary color wavelengths or three separate light sources emitting at three primary

wavelengths. However, Ishii explicitly discloses the use of three light sources for the three primary colors and switching them sequentially, (Col 3, line 67) and (Col 4, lines 1 and 17-27). However, Ishii also discloses that such a use of separate light sources will result in an increase in size and less resolution for these devices. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the separate light sources disclosed by Ishii to the display device disclosed by Okada because it is an alternate way of obtaining light sources having the three primary colors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prasad R Akkapeddi whose telephone number is 703-305-4767. The examiner can normally be reached on 7:00AM to 5:30PM M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William L Sikes can be reached on 703-308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-4767 for regular communications and 703-305-4767 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0530.

PRA

June 24, 2002

William L. Sikes
William L. Sikes
Supervisory Patent Examiner
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